



NATIONAL RECONNAISSANCE OFFICE

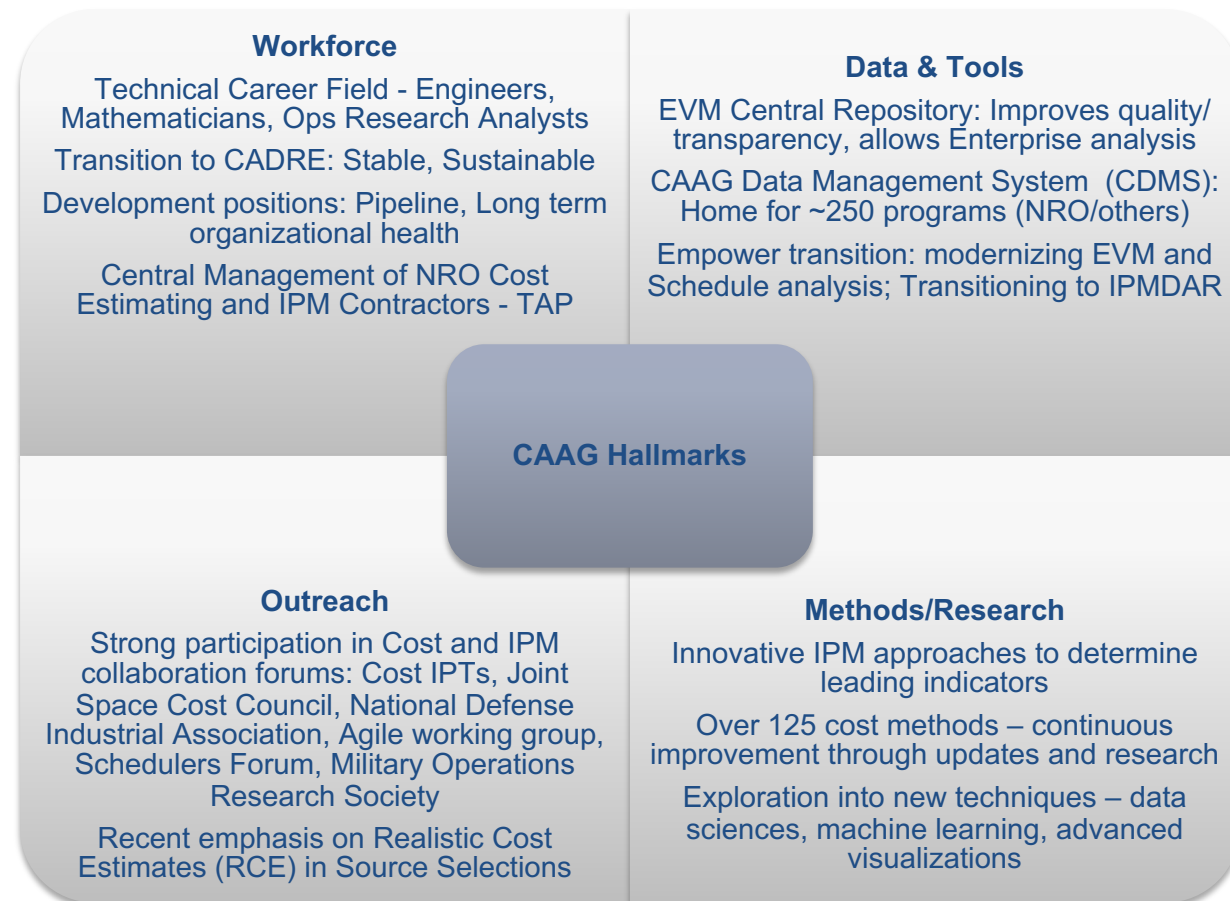
Schedule Assessment Initiatives at NRO

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NRO Cost and Acquisition Assessment Group (CAAG) provides data, tools and methods to improve acquisition outcomes for innovative overhead intelligence systems





Schedule Assessment Initiatives strengthen the NRO CAAG IPM Team's schedule analysis

Initiatives in this Briefing:

Schedule Execution Metrics

– including new visualization of schedule slip over time and application in the business rhythm with emphasis on predictive trends

Schedule Risk Assessment Gap Analysis

– themes from recent SRAs and recommendations for focused areas of improvement in accuracy and repeatability



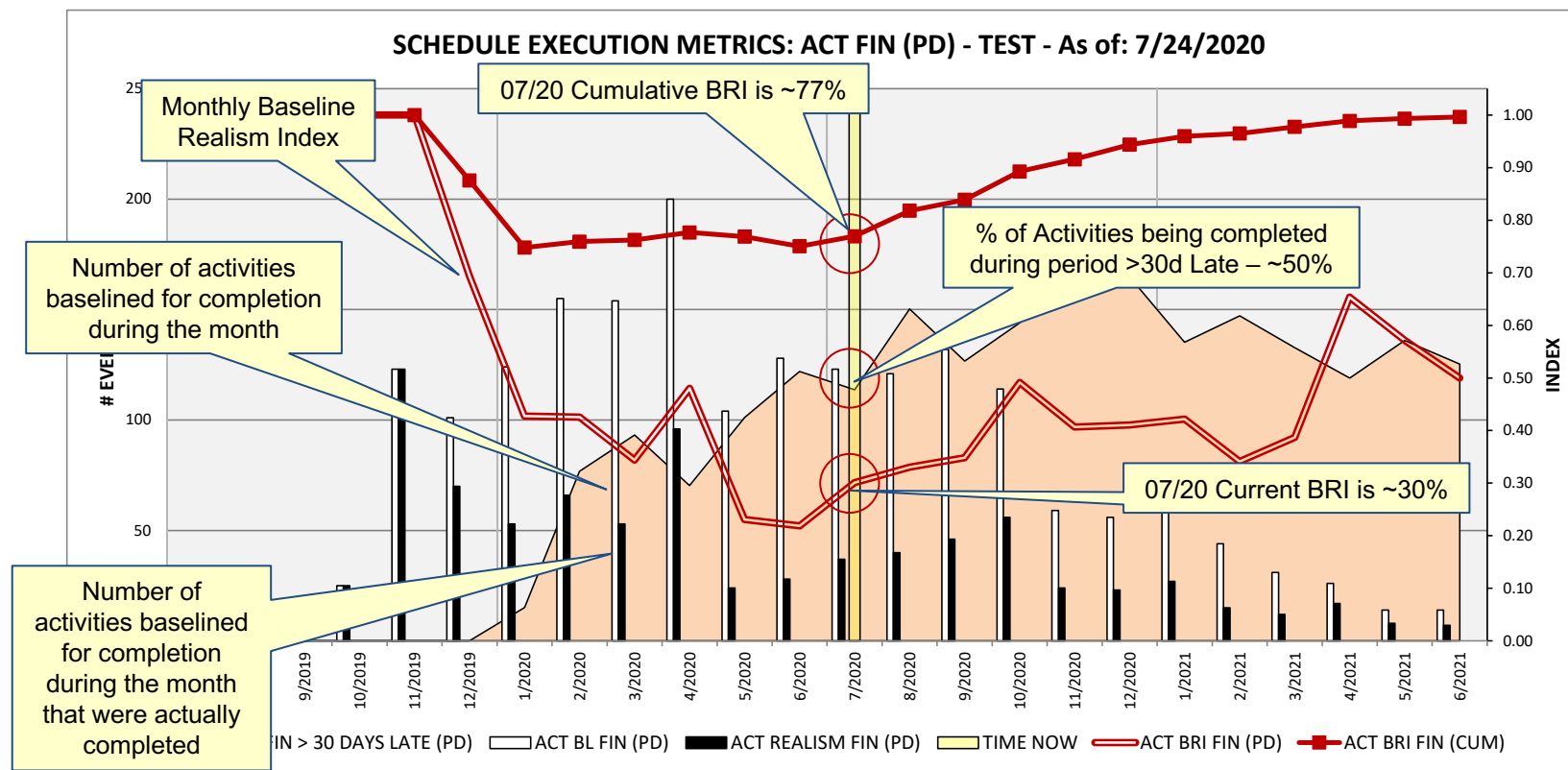
Schedule Metrics Update

- NRO maintains corporate toolset for consistent metrics calculations
 - Is the work being performed as planned?
 - Are resources being expended to accomplish backlog?
 - How reliable is the forecast?
- Continues to update data visualizations to meet needs and incorporate new ideas
 - How do this period's metrics compare to a previous period?
- The following slides provide some recent examples used for program assessment and program recovery



Baseline Realism Index (BRI)

Tabular data is also available for more data to support each of these metrics

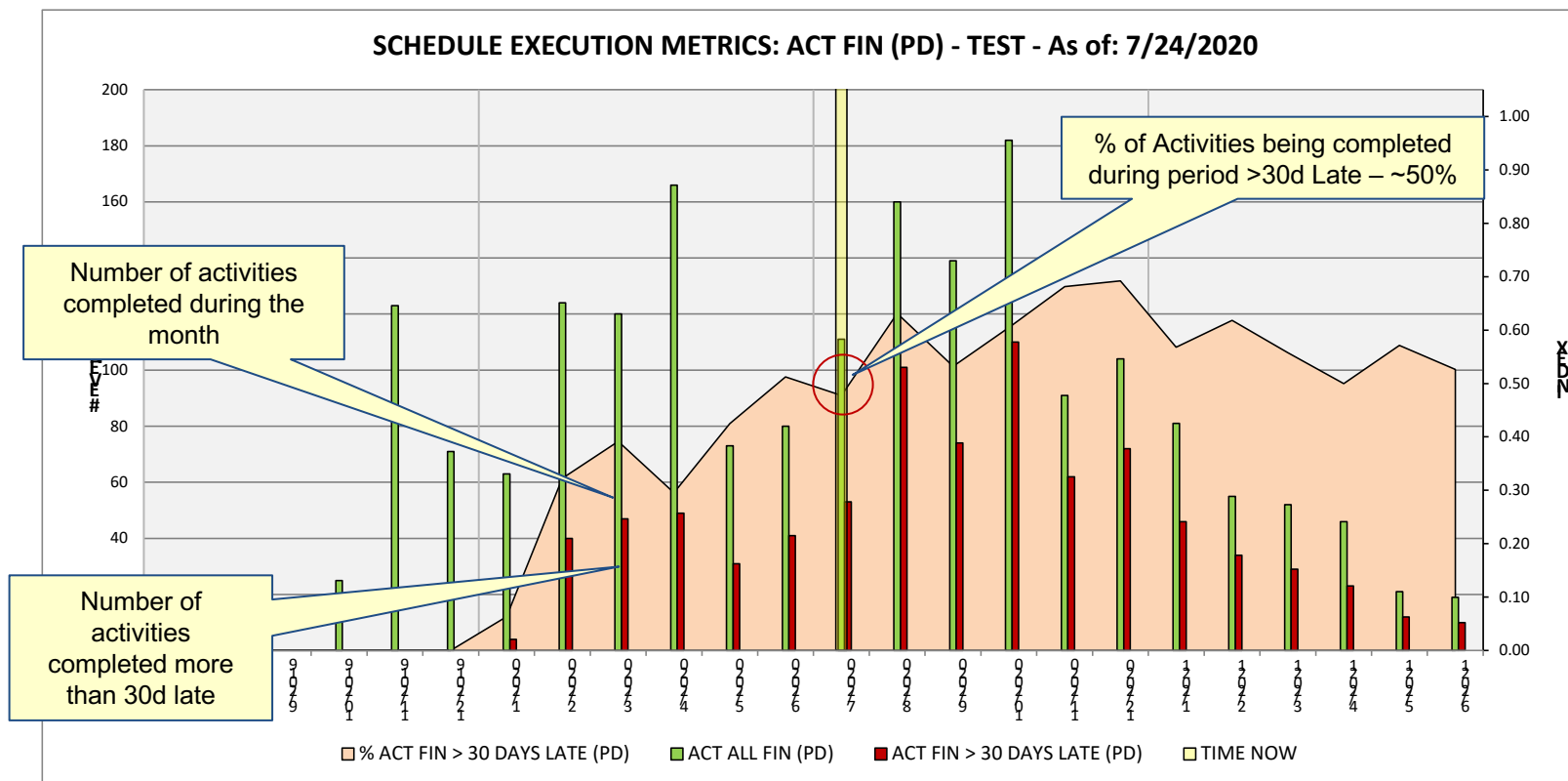


Interpretation: The trend of activities completed of those that were baselined for completion completed has been dropping regularly since 11/19. During that same time frame, the percentage of completions >30d late (compared to total completions in the month) has a slight dip in 07/20 but has a projected uptick in 08/20

Management Value: the downward trend and low level of BRI leads to questions as to whether the plan is achievable



Schedule Workoff

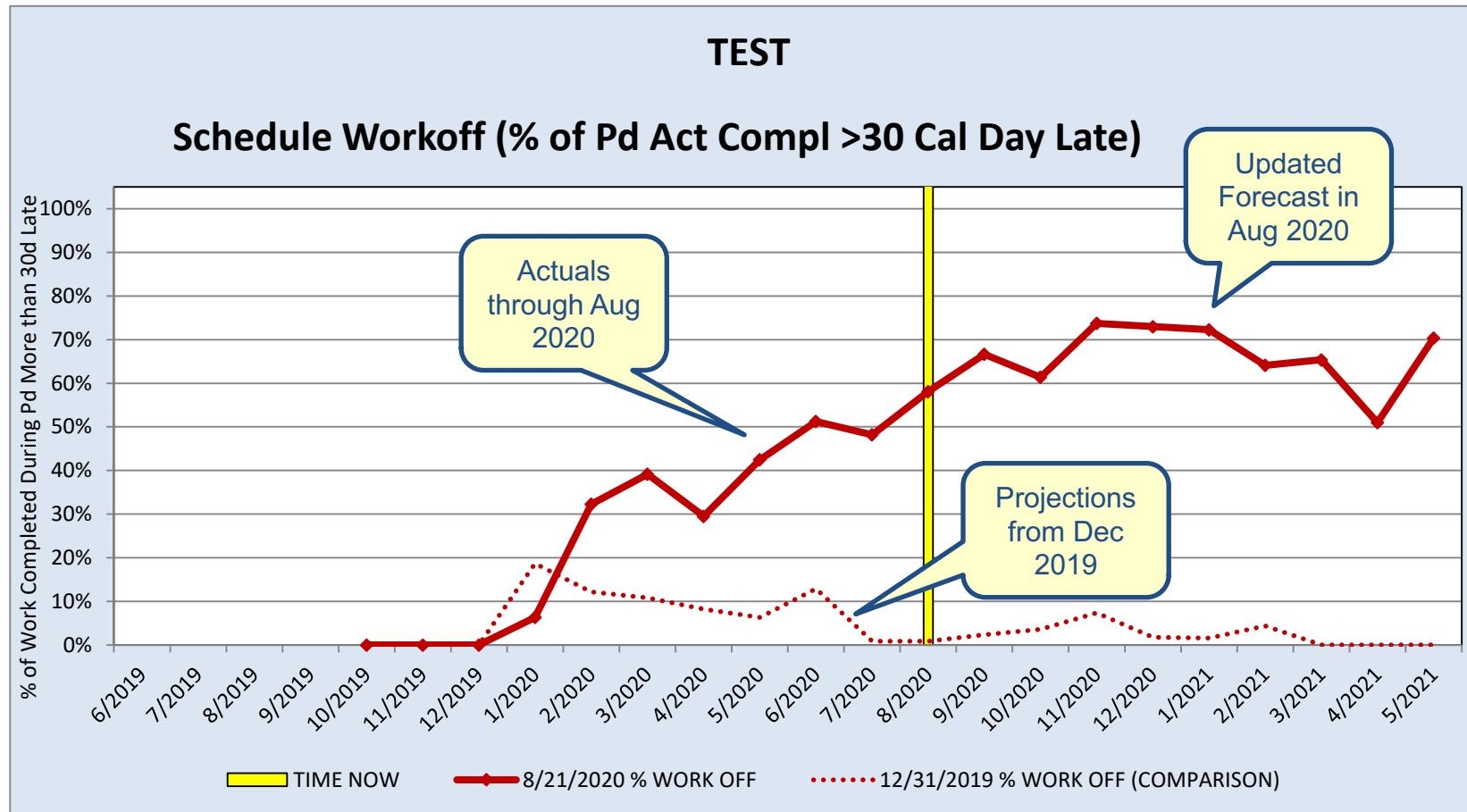


Interpretation: This view shows the numbers behind the mountain chart on the previous slide – During the next 12 months, the majority of completions will be more than 30 days late

Management Impact: early indication that the program will need resources (cost, time) to work off late tasks



Schedule Workoff, changes over time



Interpretation: The percentage of activities completed each month >30d late is significantly higher in Aug 2020 than was projected in Dec 2019 – Future shows growth compared to Aug 2020 data

Management Impact: visualizing the increase in level of schedule workoff shifts focus of program management review to late tasks that keep slipping, to resolve barriers to completion



Next Steps in Schedule Execution Metrics

- Schedule Execution Metrics are in use in program offices and for independent assessments
- Continual tool enhancement
- Ongoing studies to use historic data for more predictive value



(U) Contractor SRA Gap Introduction

- A Schedule Risk Assessment (SRA) is a very good simulation tool for assessing a schedule's time to complete
 - Based on estimate (duration) uncertainty
 - Uses duration inputs as Probability Distribution Functions (PDF)
 - Results are only as good as the inputs
- There are some gaps in current industry practice
 1. Adequate documentation of duration uncertainty factors
 2. Use of Risk register consequences into SRA inputs
 - From the PASEG v3 2019, tasks should be identified for risk mitigation steps.
There is no mention of impact assessment used in a SRA



Gap 1: Duration Factors for SRA Inputs

Observation

- Triangle factors vary widely in SRAs with opportunities to improve substantiation of basis
 - Historical data reference
 - Basis of estimate or justification of factors
 - Standards, studies, or research available

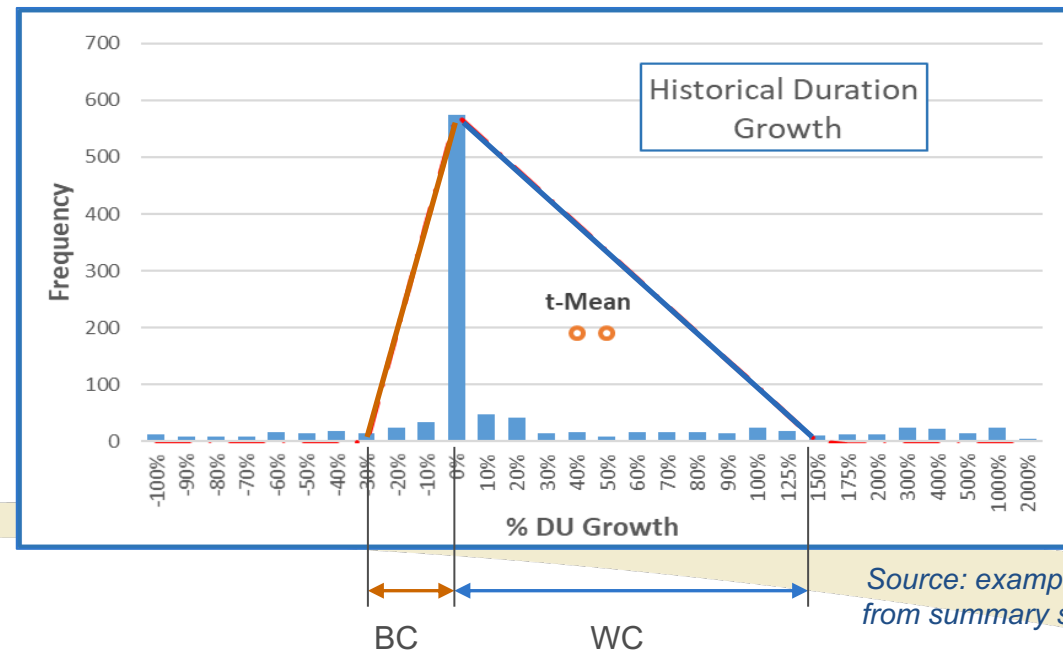
Recommendation

- Use historical IMS data to develop best case and worst case factors for triangle PDFs
- Areas for additional study: WBS elements or tasks of like kind will have different factors

Are current SRA inputs calibrated to historical performance?

Example: Are inputs with 0% - 3% duration growth used when historical performance is significantly higher

Typical IMS Duration Growth Analysis



Source: example of derived data from summary statistical analysis



Gap 2: Risk Integration

Observation

- The risk register cost impacts flow into the EAC, but how are schedule consequences modelled in the SRA?
- IMS tasks sometimes mapped to risks
 - Modeling approach of impacts
 - Rarely implemented, mitigation steps only

Recommendation

- Risk register data should include schedule impacts
- Risks milestones can be integrated into the IMS
 - Will not impact the deterministic schedule critical path
- Simulation will assess the impacts during the SRA
 - Task existence = Likelihood
 - Consequence = Uniform PDF duration

Risk Register

RISK MATRIX					
LIKELIHOOD	5 (>80%)				
	4 (60-80%)	R063 R067	R003 R066		
	3 (40-60%)	R047	R012 R028 R029		
	2 (20-40%)	R022 R041 R058	R004 R006 R056		
	1 (< 20%)		R007 R016 R018 R031 R062 R071	R020	R050
		1 (<\$0.1M < 2 weeks No/Negligible degradation)	2 (\$0.1-1M 2wks - 1 mon Minor degradation)	3 (\$1-5M 1 - 3 mons Moderate degradation)	4 (\$5-20M 3 - 6 mons Substantial degradation)
CONSEQUENCE					

Integrate

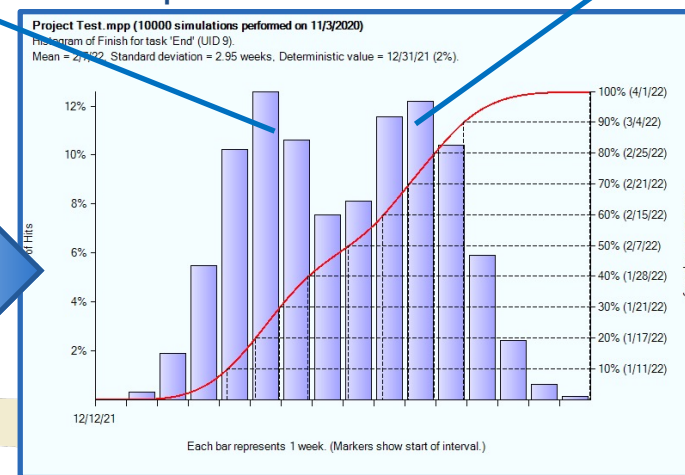
Risk Integrated IMS

Task Name	Likelihood	Consequence
Program Milestones		
ATP	0	0 d
PDR	0	0 d
CDR	0	0 d
TRR	0	0 d
PSR	0	0 d
IOC	0	0 d
Risks		
R003	50	20 d
R004	40	15 d
R006	15	40 d
Activities		
Start	0	0 d
a	0	0 d
b	0	0 d
c	0	0 d
d	0	0 d

Duration Uncertainty

Impacts

Risk Impacted SRA



Risk Register



SRA Gap Summary

- Spacecraft schedules have inherent risk and require critical path management
 - The sufficiency of schedule margin to mitigate schedule impacts

Gap	Action
① Adequate documentation of duration uncertainty factors	Use of historical data to determine duration uncertainty factors
② Use of Risk register consequences into SRA inputs	Integration of risk register consequences into the SRA

Closing SRA gaps may lead to better schedule predictability